Creative technology made by rbr

Operating Instructions

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1. Application and components

The ecom-DPK easies tightness tests at gas pipes networks. Besides draught and gas pressure measurements, preliminary and main checks as well as leakage volume determination according to DVGW-TRGI can be performed. The following components belong to the ecom-DPK set:

Standard

ecom-DP
Handy differential pressure instrument with automatic check programmes

Compressed-air pump
for build-up of test pressure in gas pipe

Crosspiece with safety valve
for flexible connection by various measure-ment duties

3 connection hoses
each 1.2 m long with quick-fitting

Conic test stopples
1/2“ - 3/4“ and
3/4" – 1 1/4",
for usability and pressure tests

One-pipe counter cap
with swivel nut R 2" and quick fittings for usability and pressure tests

Option

Gas leak detector ecom-GSK
for identification of leakages also to hardly accessible installations thanks to swan-neck

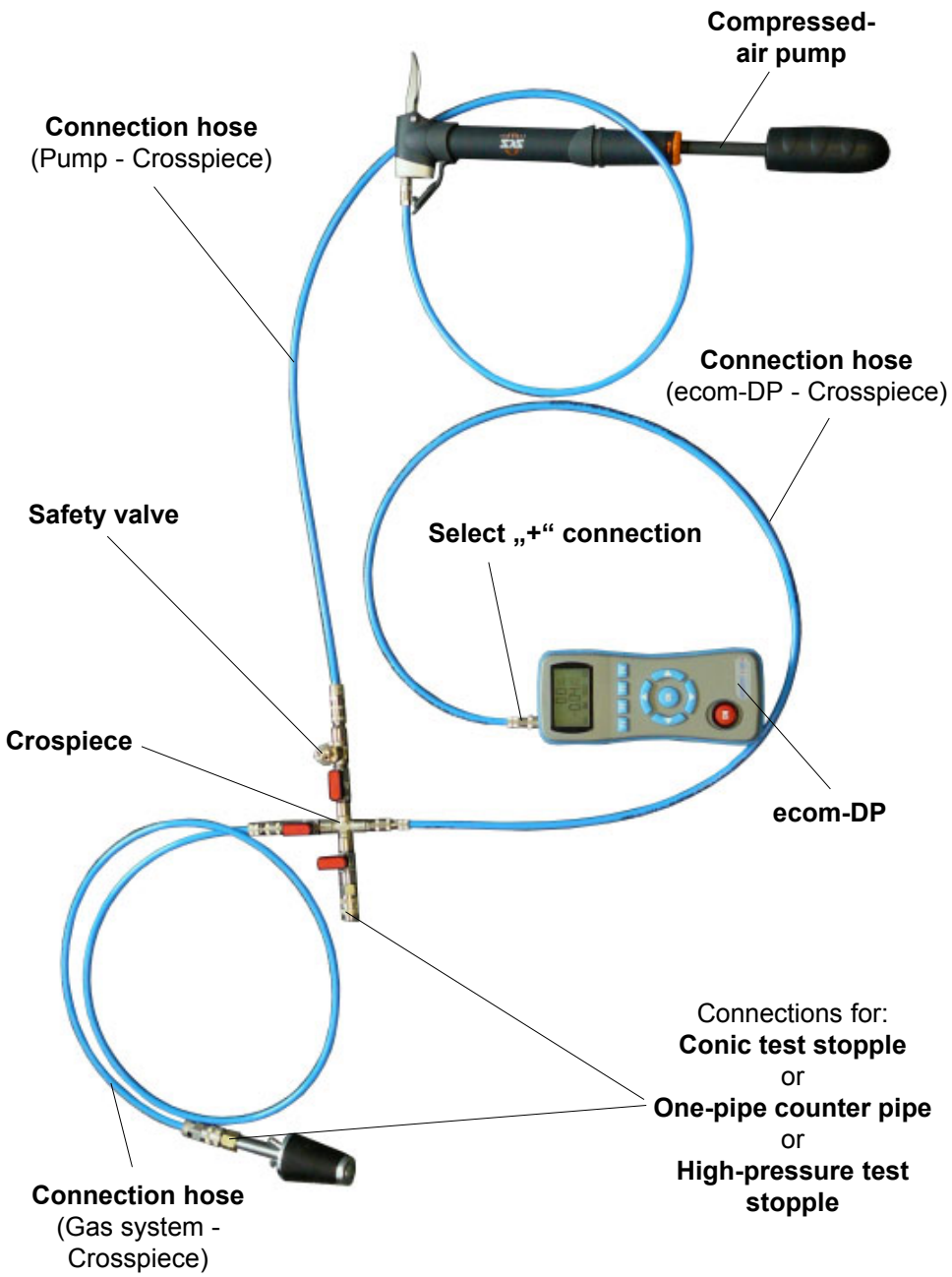
High-pressure test stopples
3/8“ to 1/2“ and
3/8“ to 3/4“
with quick-fitting

Infrared thermal printer
for documentation of test results

2. Design ecom-DP

3. Connections

Please connect the components as shown on below plan.



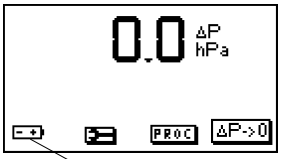
4. Initialisation

4.1. Power supply

The ecom-DP is powered by 3 batteries or 3 accumulators. The following types can be used to operate the instrument:

- Battery 1,5 V AA (Mignon)
- Accu 1,2 V AA NiCd (nickel cadmium)
- Accu 1,2 V AA NiMh (metal hydride)

If you are using a accu charger, please adjust the function „Bat. Loading“ (see chapter 8.4.)



Accu warning

Open the battery compartment and insert the batteries. Be careful to ensure proper polarity. If using the rechargeable battery type, it will be necessary to fully charge the batteries prior to initial use (approx. 4 hours). The voltage of the batteries is monitored by the DP and will indicate a low battery condition by approx. 3.3 V by beeping and flashing a signal on the LCD display. If the voltage sinks (approx. 3 V) so the ecom-DP will automatically switch off.

4.2. Accu charging

The accu charging procedure is monitored by the ecom-DP. Once connected to AC power, the instrument switches on. During the charging procedure, a BATTERY indicator will be shown on the LCD display. Once the battery is fully charged, the BATTERY indicator on the display will blink. It is possible to operate the ecom-DP on AC power during the charging procedure by pressing the <ON> button.

4.3. Setting clock

The internal clock and the internal RAM memory of the ecom-DP are buffered via a condensator. If the instrument is not alimentated during more than approx. 10 minutes, so the recorded information on these fields get lost. Before using the ecom-DP for the first time, adjust the internal clock and delete the internal RAM memory.

Press <ON> to switch on the ecom-DP.
The instrument displays the following:

Clock set
Delete RAM
Press OK to continue!

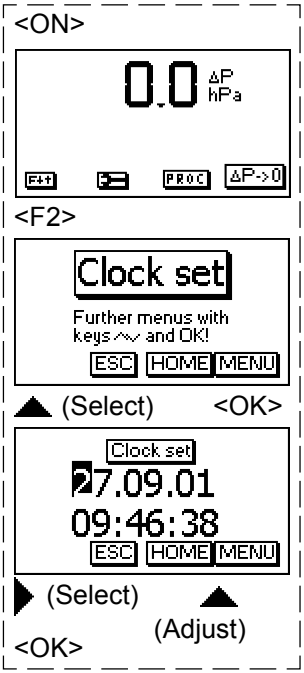
- Press twice the <OK> key and the measurement value menu will be displayed.
- Press <F2> (wrench symbol) to call up the menu „Instrument settings“.
- With the cursor keys <UP/DOWN> scroll until the menu point <Set clock>.
- Press <OK> to activate.

Date and time can be set as follows:

1. Select with the cursor keys <RIGHT/LEFT> the position to be changed (corresponding field blinks).

2. Adjust the correct numbers with the cursor keys <UP/DOWN>.

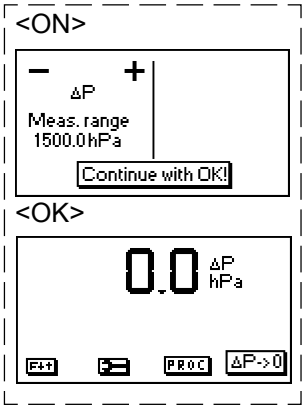
3. Press <OK> to confirm correct date and time settings.



5. Numerical indication

Caution: If „Pressure Auto -> O by start“ (capter 8.2.) is set on „YES“, so the internal pressure sensor should be flown with pressure first after the switch-on of the instrument, as they are zeroed during said switch-on procedure.

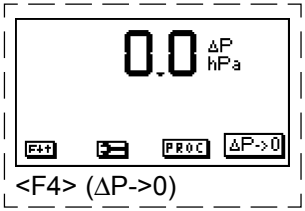
After switch-on, the specifications of the pressure sensor will be displayed: denomination, measurement range and connection seizure (+/-). Press <OK> to access to the measurement value menu.



5.1. Zeroing the internal pressure sensor

Please remember not to flow the pressure sensors with pressure during the zeroing procedure.

As the difference pressure sensor can drift because of its sensitivity in the zero point, it is possible to reset the zero point.

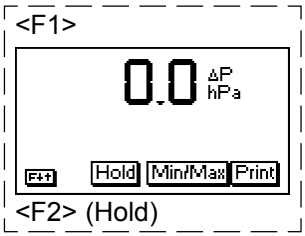


- Press <F4> (ΔP1) to zero the value of the pressure sensor.

Different functions can be called up with the function key <F1>. The current seizure of the other function keys (<F2> - <F4>) is shown on the display. Press one time <F1> to display the functions „Hold“, „Min/Max“ and „Print“.

5.2. Freezing of measurement value

- Press <F2> (Hold) to „freeze“ that measurement value displayed at the time the key is pressed (active function = Hold indication blinks).
- Press again <F2> (Hold) to quit the „freezing“ and the current value will be displayed.



5.3. Minimal / Maximal mesurement values

With <F3> (Min/Max) the determined minimal and maximal values since unit´s switch-on (or deleting via „CLR“) can be called up.
- Press one time <F3> (Min/Max) to view the lowest determined values (Min/Max blinks).
- Press <F2> (CLR) to delete the minimal values (new scanning begins).
- Press again <F3> (Min) to view the highest values (Min/Max blinks).
- Press <F2> (CLR) to delete the highest values (new scanning begins).
- Press one more time <F3> (Max) to quit the menu.

<F3> (Min/Max)

<F2> (CLR)
<F3> (Min)

<F2> (CLR)
<F3> (Max)

5.4. Printout measurement values

Press <F4> (Print) to transmit the current measurement values via the infrared interface to the IR printer (option). Condition hereto is a troublefree connection (direct sight) between the sending diode at the front of the instrument and the receiving diode of the printer. The distance between both instruments should not exceed 40 cm (1.3 foot), otherwise a troublefree transmission is not warranted at any time.
The printout can be made with the infrared printers ecom-P and HP 82240B. Please choose the used printer, as shown under capter 8.3.

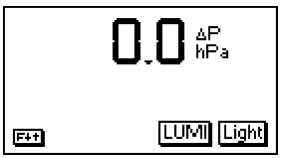
<F4> (Print)

```
----------------------------------------
      ecom-DP
----------------------------------------
 Date          Time
 05.10.01      12:12:50
----------------------------------------
 ΔP       0.0 (hPa)
----------------------------------------
              min       max
 ΔP         -0.1       0.1 (hPa)
----------------------------------------
 rbr Computertechnik
 Am Grossen Teich 2
 58640 Iserlohn
 Tel. 02371-9455
```

5.5. Contrast adjustment and lighting

Basing on the previous function seizure, the functions „LUMI“ and „Light“ are displayed after pressing <F1>. The graphic display of the ecom-DP can be adjusted to different visual conditions. The contrast can be adjusted in 5 steps (each key pressing = one step) while pressing <F3> (LUMI). Additionally the backlighting of the display can be activated while pressing <F4> (Light).

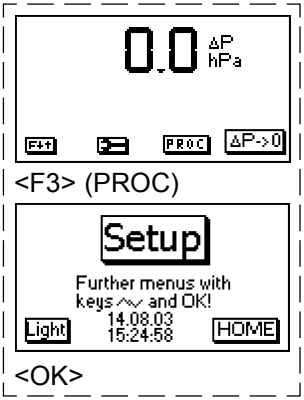
<F2> (ESC)



<F3> (LUMI)
<F4> (Light)

6. Check programmes

Call up the pre-programmed measurement routines „Preliminary Check“, Main Check“ and „Usability Check“ in the menu <F3> (PROC).
Parameters to each measurement routine can be adjusted in the menu „Setup“.



6.1. Setup

Scroll with <UP/DOWN> until the menu <Setup>. Press <OK> to activate the menu. The following parameters can be adjusted for the corresponding measurement routine:

Pressure Check
- Stabilisation time (1 - 10 min, default: 1 min)
- Measurement time (10 - 120 min, default: 5 min)

Preliminary Check
- Stabilisation time (1 - 10 min, default: 1 min)
- Measurement time (10 - 120 min, default: 10 min)
- Test pressure (900 - 1200 hPa, default: 1000 hPa)

Main Check
- Stabilisation time (1 - 10 min, default: 1 min)
- Measurement time (10 - 120 min, default: 10 min)
- Test pressure (90 - 160 hPa, default: 110 hPa)

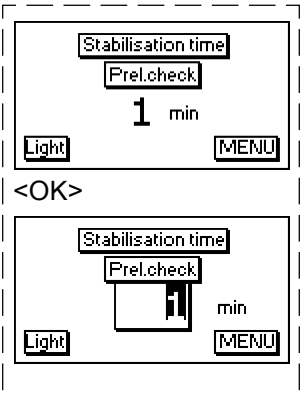
Usability check
- Stabilisation time (1 - 270 min, default: 1 min)
- Measurement time (10 - 240 min, default: 10 min)
- Test pressure (20 - 160 hPa, default: 50 hPa)
- Max. operation pressure (10 - 100 hPa, default: 20 hPa)
- Air pressure (800 - 1200 hPa, default: 1013 hPa)

Each parameter can be adjusted the same way:

1. Select the parameter with <UP/DOWN>.

2. Press <OK> to activate.

3. Use the cursor keys <RIGHT/LEFT> to select the position to be changed (corresponding field blinks).



4. Adjust the correct figure using <UP/DOWN>.

5. Press <OK> to confirm the corrrected value.

6.2. Pressure check

Proceed as follows:

1. Close the conduit with a suitable adapter (test stopple, high-pressure stopple or one-pipe counter cap).

2. Connect the components a described in chapter 3.

3. Scroll with <UP/DOWN> until the menu „Pressure check“. Activate with <OK>-Taste.

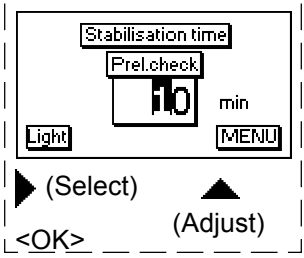
4. With the compressed-air pump create the pre-adjusted test pressure (the unit beeps as soon as the pressure level is achieved).

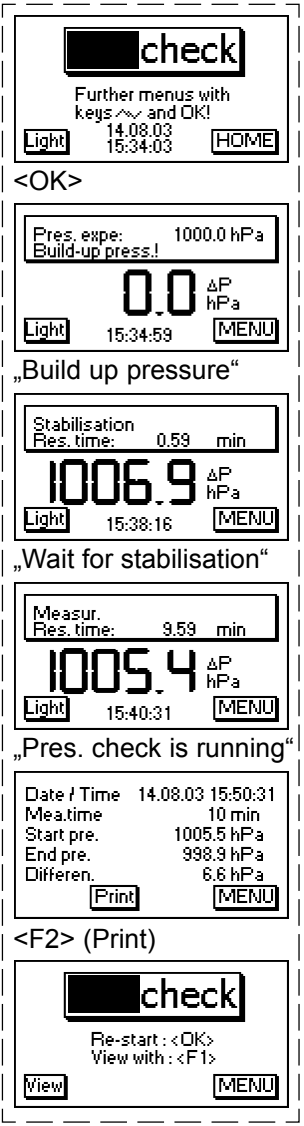
5. Interrupt the connection to the air pump (switch-off the ball valve).

6. Wait for stabilisation time (if the pressure remains in the range „test pressure +/- 10% during stabilisation time, so the measurement time will start).

7. Once the measurement time is over, the result is displayed and can be sent to the IR printer (option) thus pressing <F2> (Print) .

8. If the menu „Pressure Check“ is selected again, so the result can be called up with <F1> (as long as the ecom-DP is on) or a new measurement can be started with <OK>.





6.3. Preliminary check

The preliminary check acc. to DVGW – TRGI Process Instructions G 600 by pipes (operation pressure up to 100 hPa) is registered as a measurement routine in the ecom-DP.

Proceed as follows:

1. Close the conduit with a suitable adapter (test stopple, high-pressure stopple or one-pipe counter cap).

2. Connect the components a described in chapter 3.

3. Scroll with <UP/DOWN> until the menu „Preliminary check“. Activate with <OK>-Taste.

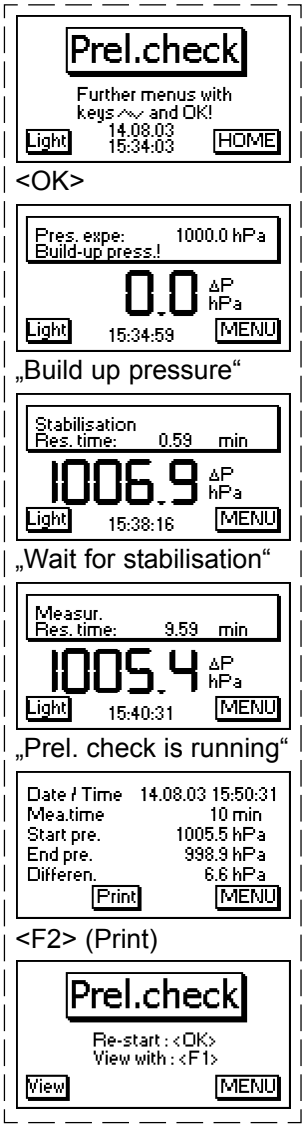
4. With the compressed-air pump create the pre-adjusted test pressure (the unit beeps as soon as the pressure level is achieved).

5. Interrupt the connection to the air pump (switch-off the ball valve).

6. Wait for stabilisation time (if the pressure remains in the range „test pressure +/- 10% during stabilisation time, so the measurement time will start).

7. Once the measurement time is over, the result is displayed and can be sent to the IR printer (option) thus pressing <F2> (Print) .

8. If the menu „Preliminary Check“ is selected again, so the result can be called up with <F1> (as long as the ecom-DP is on) or a new measurement can be started with <OK>.



6.4. Main Check

The main check acc. to DVGW – TRGI Process Instructions G 600 by conduits (operation pressure up to 100 hPa) is registered as a measurement routine in the ecom DP. Proceed as follows:

1. Close the conduit with a suitable adapter (test stopple, high-pressure stopple or one-pipe counter cap).

2. Connect the components a described in chapter 3.

3. Scroll with <UP/DOWN> until the menu „Main Check“. Activate with <OK>-Taste.

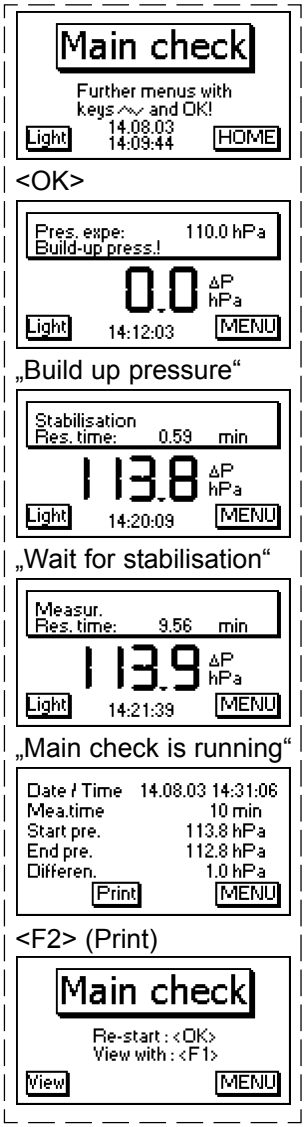
4. With the compressed-air pump create the pre-adjusted test pressure (the unit beeps as soon as the pressure level is achieved).

5. Interrupt the connection to the air pump (switch-off the ball valve).

6. Wait for stabilisation time (if the pressure remains in the range „test pressure +/- 10% during stabilisation time, so the measurement time will start).

7. Once the measurement time is over, the result is displayed and can be sent to the IR printer (option) thus pressing <F2> (Print) .

8. If the menu „Main Check“ is selected again, so the result can be called up with <F1> (as long as the ecom-DP is on) or a new measurement can be started with <OK>.



6.5. Usability Check

The usability check acc. to DVGW – TRGI Process form G 624 by conduits is memorised as a measurement routine by the ecom-DP. The calculation of the leak rate happens automatically according to the following equation and corresponds herewith to the procedure of the DVGW-TRGI Process Form G 624:

VB = V/TM * ((PA + P1)/(PA + P2)-1) * PB/P1 * f

with:
- **VB** = Gas leak volume in operation state (l/h)
- **V** = Pipe content in litres
- **TM** = Measurement duration in hours
- **PA** = Barometre stand in hPa
- **P1** = Test pressure at meas. beginning in hPa
- **P2** = Test pressure at measurement end in hPa
- **PB** = Maximal gas operation pressure in hPa
- **f** = Factor for consideration of gas type

Proceed as follows:

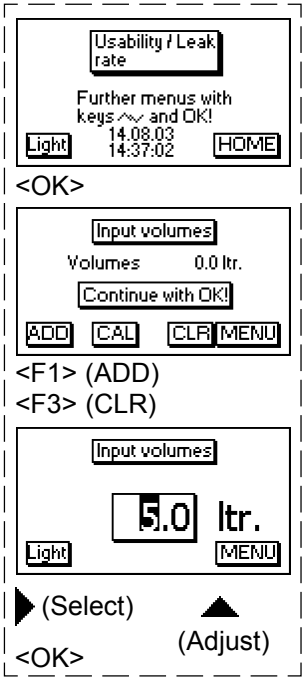
1. Close the conduit with a suitable adapter (test stopple, high-pressure stopple or one-pipe counter cap).

2. Connect the components as described in chapter 3.

3. Scroll with <UP/DOWN> until the menu „Suitability/ Leak rate“. Activate with <OK>.

4. The pipe volume to be checked **(V)** is needed for the calculation of the leak rate. The ecom®-DP offers two input possibilities:

   a. Direct input of pipe volume after having pressed <F1> (ADD) (by repeated input the value will be added).



b. The ecom-DP will portionally calculate the pipe volume basing on the diameter and the length for thread pipe acc. to DIN 2440 (middle heavy):

- Press <F2> (CAL).

- Use <UP/DOWN> to select the pipe diameter (1/2“ to 4“) and confirm with <OK>.

- Select pipe length with the the cursor keys and confirm with <OK>.

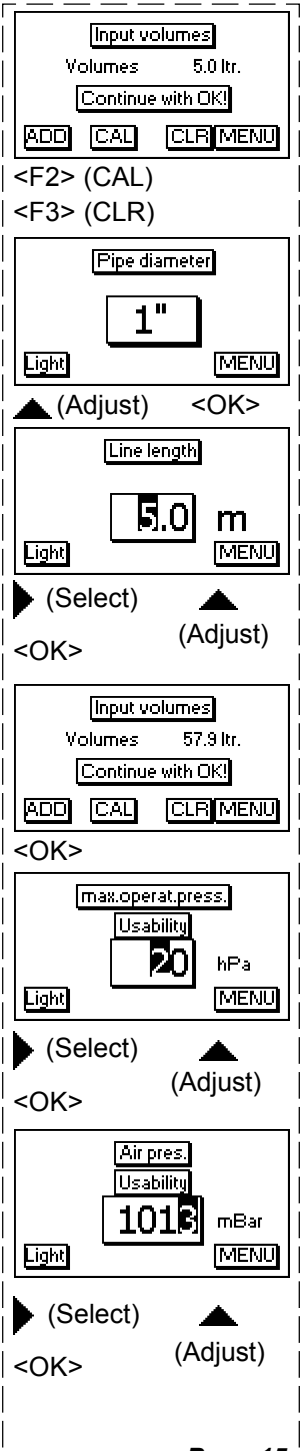
- The volume for thread pipe acc. to DIN 2440 (medium heavy) will be calculated and added.

- Repeat procedure until all pipes sections are registered.

5. Quit the volume input with <OK>.

6. The maximal operation pressure adjusted in the setup **(PB)** will be displayed. If need be, the value can be changed using the cursor keys. Confirm the value with <OK>.

7. The air pressure **(PA)** adjusted in the setup is displayed. If need be, the value can be changed using the cursor keys. Confirm with <OK>.



8. Use <UP/DOWN> to select the used gas type **(f)** and confirm with <OK>. The following gas types are recorded with their respective factors:

Natural gas
Air
City gas
Propane
Butane
Hydrogen

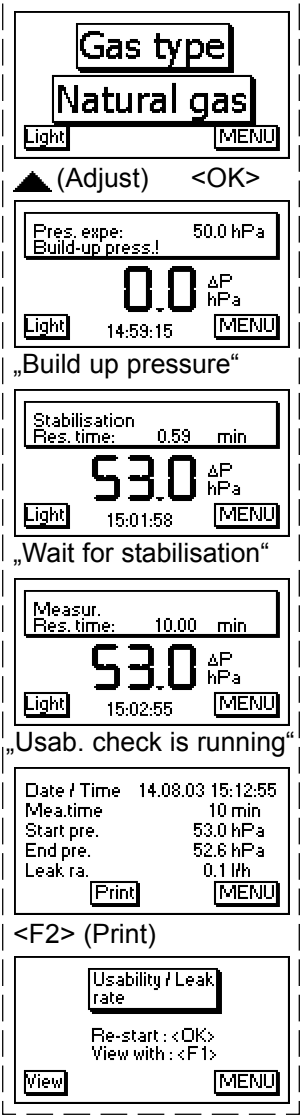
9. With the compressed-air pump create the pre-adjusted test pressure (the unit beeps as soon as the pressure level is achieved).

10. Interrupt the connection to the air pump (switch-off the ball valve).

11. Wait for stabilisation time (if the pressure remains in the range „test pressure +/- 10% during stabilisation time, so the measurement time will start).

12. Once the measurement time is over, the result is displayed and can be sent to the IR printer (option) pressing <F2> (Print) .

13. If the menu „Usability Check“ is selected again, so the result can be called up with <F1> (as long as the ecom-DP is on) or a new measurement can be started with <OK>.



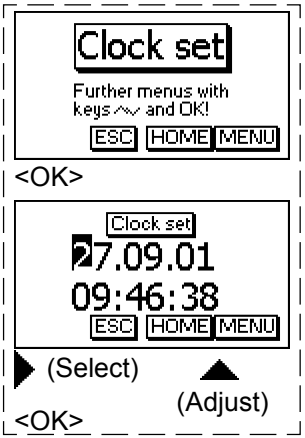
7. Clock set

- Scroll with <UP/DOWN> until the menu point <Set clock>.
- Press <OK> to activate. Date and time can be adjusted as follows:

1. Select with <RIGHT/LEFT> the position to be changed (corresponding field blinks).

2. Adjust the correct figures using <UP/DOWN>.

3. Confirm with <OK>.

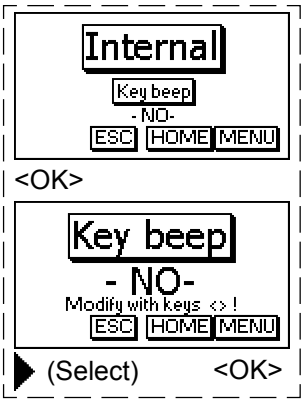


8. Internal instrument settings

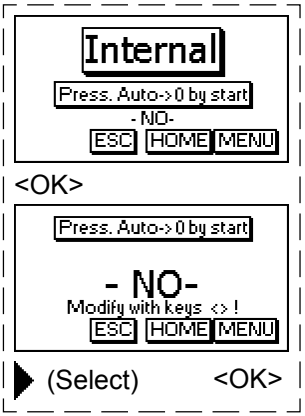
Further instrument settings can be performed in the menu <Internal>. Press <OK> to access this menu.

8.1. Switch on/off key beep

- With the cursor keys <UP/DOWN> scroll until the menu point <Key beep>.
- Activate with <OK>.
- With the cursor keys <RIGHT/LEFT> modify the adjustment (YES or NO).
- Confirm with <OK>.



8.2. Pressure Auto -> 0 by start



The ecom DP normally zeroes the internal pressure sensor during switch-on (adjustment „YES“). If the instrument is to remain connected to a pressure source, so this adjustment can be modified:
- Scroll with the cursor keys <UP/DOWN> until the menu point <Pressure auto -> 0 by start>.
- Press <OK> to activate.
- Use the cursor keys <RIGHT/LEFT> to modify the adjustment (YES or NO).
- Confirm the modification with <OK>.

8.3. Choose printer (ecom-P)

Please choose the used printer as follows:
- Scroll with the cursor keys <UP/DOWN> until the menu point <ecom-P>.
- Press <OK> to activate.
- Use the cursor keys <RIGHT/LEFT> to modify the adjustment (YES = printer ecom-P or NO = printer HP 82240B).
- Confirm the modification with <OK>.

8.4. Battery loading

The ecom-DP is able to work with accu´s and AC power (option):
- Scroll with the cursor keys <UP/DOWN> until the menu point <Battery loading>.
- Press <OK> to activate.
- Use the cursor keys <RIGHT/LEFT> to modify the adjustment (YES = using AC power for charging accu´s or NO = no AC power used).
- Confirm the modification with <OK>.

8.5. Display damping

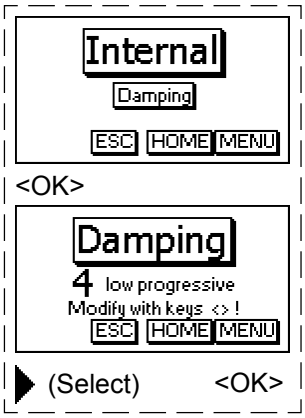
The display damping can be adjusted to various measurement duties. 7 damping steps can be selected (1 = no damping; 7 = high damping).

Additionally the damping steps 3 - 7 enable the selection of a damping progression. This means:

not progressive:
by massive pressure changes the display does **not** react faster than by small pressure changes

low progressive:
by massive pressure changes the display reacts **somewhat** faster than by small pressure changes.

high progressive:
by massive pressure changes the display reacts **much** faster than by small pressure changes.

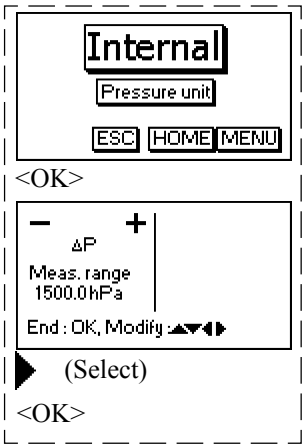


- To change the adjustment, scroll with the keys <UP/DOWN> until the menu point <Damping>.
- Press <OK> to activate.
- Adjust the desired damping step using the cursor keys <RIGHT/LEFT>.
- Press <OK> to confirm.

8.6. Pressure unit

The measuring unit of the internal pressure sensor can be changed. The following units are selectable:

Hectopascal	hPa
Centimetre water column	cmH2O
Millimetre mercury column	mmHg
Pound per square inch	PSI
Inch water column	“H2O
Inch mercury column	“Hg



For modification:

- Scroll with the cursor keys <UP/DOWN> until the menu point <Pressure unit>.
- Press <OK> to activate.
- Use the cursor keys <RIGHT/LEFT> to adjust the desired unit for the pressure sensor.
- Press <OK> to confirm.
- Press <F2> (ESC) to quit the menu <Internal>.

9. Sensor setup

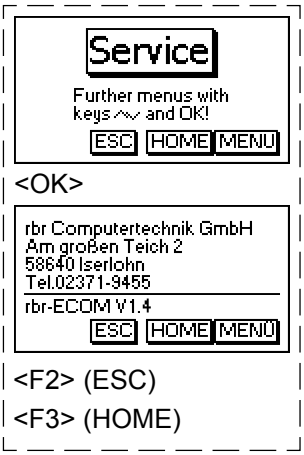
The sensors in the instrument are given factory specified designations that can be changed by the user. Using the <UP/DOWN> cursor keys, scroll to <Sensor setup> menu. Press <OK>. Using the <UP/DOWN> cursor keys, select the sensor to be renamed and enter the edit function by pressing <OK>.
A maximum of 6 characters (letters, numbers and special characters) can be used in the sensor customization/ designation. Using the <UP/DOWN> cursor keys, select the position to be changed (sign blinks). Use the <UP/ DOWN> cursor keys to select the character that should stand on this position.
Starting from the current one and using the <UP> key, the following characters are stored in the instrument in the following succession:

Blank sign
A - Z
a - z
Ä -Ü
ä - ß
0 - 9
Special characters

Once the renaming procedure is complete, press <OK> to store.

10. View service information

- Use the cursor keys <UP/DOWN> to scroll thru until the menu point <Service>.
- Press <OK> and an info window will be opened in which the address and phone number of the competent service centre as well as the instrument version (e.g. rbr-ECOM V1.4) will be displayed.



11. Technical Data ecom-DP

Power supply:	- Battery: 3 x 1,5 V AA (Mignon) - or accu: 3 x 1,2 V AA NiCd (nickel cadmium) - or accu: 3 x 1,2 V AA NiMh (metal hydride) - Internal loading unit - Connection via 1.3 mm hollow plug - Loading current approx. 500 mA
Power consumption:	- With backlit approx. 90 mA - Without backlit approx. 45 mA - Operation time depending on used power supply
Display:	- Graphic display - Resolution 128 x 64 pixel - Window approx. 43 x 28 mm
Operation: **(menu-monitored)**	- 4 cursor keys - 1 confirmation key - 4 function keys - 1 ON/OFF key
Differential pressure measurement:	- Pressure range +/- 1500 hPa (mbar)
Resolution:	0.1 hPa
Accuracy:	< 3% of measurement value
Internal clock:	- Adjustment via menu and keyboard - Buffer accu for battery change only (approx. 1 minute)
Dimensions (LxWxH):	Approx. 170 x 75 x 35 mm
Weight:	Complete approx. 300 g
Ambient temperature:	0 bis 50 °C

Subject to technical changes
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